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10/567,883	08/14/2006	Wilhelm Stein	12406-147US1 P2003.0562 U	2118

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EXAMINER	
YEUNG LOPEZ, FEIFEI	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,883	STEIN ET AL.	
	Examiner	Art Unit	
	Feifei Yeung-Lopez	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34,42 and 44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34,42 and 44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/9/06; 9/19/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

1. The Examiner agrees with the Applicant's arguments regarding Species II and III in the Restriction Requirement mailed on September 25, 2007.

DETAILED ACTION

Amendments to the specification and the claims filed on 2/19/06 are acknowledged and have been entered.

2. Claim 25 is objected to because of the following informalities:

3. Regarding claim 25, "a current spreading layer" lacks antecedent basis, it's interpreted as the first current spreading layer mentioned in claim 1 for the purpose of this rejection. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1,3,5-12,17-18,21,25-26,33,42 are rejected under 35 U.S.C. 102(e) as being anticipated by Kneissl et al (US Patent 6,515,308).

6. Regarding claim 1, Kneissl teach a radiation-emitting semiconductor component comprising: a semiconductor body that includes a first principal surface (surface 142 in fig. 1), a second principal surface (surface 144) and a semiconductor layer sequence

(layers between layers 102 and 136) with an electromagnetic radiation generating active zone (layer 114), said semiconductor layer sequence being disposed between the first and the second principal surfaces, wherein the radiation-emitting semiconductor component further comprises: a first current spreading layer (layer 126) disposed on said first principal surface and electrically conductively connected to said semiconductor layer sequence; and a second current spreading layer (layer 108) disposed on said second principal surface and electrically conductively connected to said semiconductor layer sequence.

7. Regarding claim 3, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers (layer 126 in fig. 1, column 9, lines 19-26) contains a material that is transparent (column 6, lines 2-5) to the generated radiation.

8. Regarding claim 5, Kneissl teach that the radiation-emitting semiconductor component as in claim 3, wherein said radiation-transparent material contains an oxide (ITO layer 126 in fig. 1, column 9, lines 19-26).

9. Regarding claim 6, Kneissl teach that the radiation-emitting semiconductor component as in claim 5, wherein said oxide is a metal oxide (ITO layer 126 in fig. 1, column 9, lines 19-26).

10. Regarding claim 7, Kneissl teach that the radiation-emitting semiconductor component as in claim 3, wherein said radiation-transparent material contains ITO (ITO layer 126 in fig. 1, column 9, lines 19-26).

11. Regarding claim 8, Kneissl teach that the radiation-emitting semiconductor component as in claim 3, wherein said radiation-transparent material contains ZnO (column 9, lines 19-26).

12. Regarding claim 9, Kneissl teach that the radiation-emitting semiconductor component as in claim 3, wherein said radiation-transparent material contains SnO (column 9, lines 19-26).

13. Regarding claim 10, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers contains A1, Ga, In, Ce, Sb and/or F (column 9, lines 19-26).

14. Regarding claim 11, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein disposed on at least one of said current spreading layers (DBR 136 in fig. 1) is a mirror layer.

15. Regarding claim 12, Kneissl teach that the radiation-emitting semiconductor component as in claim 11, wherein said mirror layer (layer 136 in fig. 1) is disposed on the side of said current spreading layer facing away from said semiconductor layer sequence (fig. 1).

16. Regarding claim 17, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein said semiconductor layer sequence contains at least one n- (layer 104 in fig. 1) and/or p-conductive layer (layer 118 in fig. 1).

17. Regarding claim 18, Kneissl teach that the radiation-emitting semiconductor component as in claim 17, wherein the thickness of said n-conductive and/or said p-conductive layer is in the range of a monolayer to 1000 nm (column 5, lines 19-23).

18. Regarding claim 21, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein said radiation-emitting semiconductor component is affixed to a carrier (substrate 102 in fig. 1).

19. Regarding claim 25, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein disposed on the current spreading layer (layer 126 in fig. 1) is a contact surface (layer 130) for electrical contacting.

20. Regarding claim 26, Kneissl teach the radiation-emitting semiconductor component as in claim 25, wherein said contact surface (layer 130 in fig. 1) is disposed on the side of said semiconductor layer sequence opposite to said carrier (the substrate).

21. Regarding claim 33, Kneissl teach that the radiation-emitting semiconductor component as in claim 1, wherein said semiconductor layer sequence contains a III/V semiconductor (layer 114 in fig. 1), preferably $In_xGa_yAl_{1-x-y}N$, where $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x+y \leq 1$ (column 8, lines 37-40).

22. Regarding claim 42, Kneissl teach that the radiation-emitting semiconductor component as in claim 18, wherein the thickness of said n-conductive and/or said p-conductive layer is less than 400 nm (layer 118 in fig. 1, column 5, lines 19-23).

Claim Rejections - 35 USC § 103

23. Claims 2,4,16, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claims 1,11, and 17 above, and further in view of Thibeault et al (US Patent 6,657,236 B1).

24. Regarding claim 2, Kneissl remain as applied in claim 1.

25. However, Kneissl do not teach that at least one of said two principal surfaces comprising said current spreading layers has a microstructure.

26. In the same field of endeavor, Thibeault teach a radiation-emitting semiconductor component, wherein a principal surface comprising a current spreading layer has a microstructure (layer 26 in fig. 1) for the benefit of increasing light extraction (abstrate)

27. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a principal surface comprising a current spreading layer having a microstructure for the benefit of increasing light extraction.

28. Regarding claim 4, Kneissl teach that the radiation-emitting semiconductor component as in claim 2, wherein both (column 6, lines 2-5 and column 9, lines 19-26 and 41-46) current spreading layers contain a material that is transparent to the generated radiation. Note in fig. 1 that light 140 exits from device 100 therefore both current spreading layers contain a material that is transparent to the generated radiation.

29. Regarding claim 16, Kneissl remain as applied in claim 11.

30. However, Kneissl do not teach that said principal surface has a microstructure on the side of said semiconductor layer sequence facing away from said mirror layer.

31. Thibeault teach a radiation-emitting semiconductor component, wherein a principal surface has a microstructure (layer 74 in fig. 4) on a semiconductor layer sequence (layer 64).

32. Regarding claim 19, Kneissl remain as applied in claim 17.

33. Moreover, Kneissl teach that the radiation-emitting semiconductor component as in claim 17, wherein the current spreading layer (layer 126 in fig. 1) on the side comprising the p-conductive layer of the semiconductor layer sequence contains ZnO (column 9, lines 19-26).

34. However, Kneissl do not teach that the current spreading layer on the side comprising the p-conductive layer of the semiconductor layer sequence contains Al.

35. Thibeault teach a current spreading layer contain Al (column 6, lines 11-12).

36. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over over Kneissl et al (US Patent 6,515,308) as applied to claim 11 above, and further in view of Kwon (PG Pub 2004/0120375 A1).

37. Regarding claim 13, Kneissl remain as applied in claim 11.

38. However, Kneissl do not teach that said mirror layer is electrically conductive.

39. In the same field of endeavor, Kwon teaches a mirror layer being electrically conductive (paragraph [0013]) for the benefit of providing a mirror that has optimal operation (paragraph [0012]).

40. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make said mirror layer electrically conductive for the benefit of providing a mirror that has optimal operation.

41. Regarding claim 14, Kneissl remain as applied in claim 11.

42. However, Kneissl do not teach that said mirror layer contains a metal.

43. Kwon teaches a mirror layer containing a metal (AlAs layer in paragraph [0013]).

44. Regarding claim 15, Kneissl remain as applied in claim 11.

45. However, Kneissl do not teach that said mirror layer contains Au, Ag, Al and/or Pt.

46. Kwon teaches a mirror layer containing Al (paragraph [0013]).

47. Claims 20, 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claims 1 and 17 above, and further in view of Tarsa et al (US Patent 6,614,056 B1).

48. Regarding claim 20, Kneissl remain as applied in claim 1.

49. However, Kneissl do not teach that the current spreading layer on the side comprising the n-conductive layer of the semiconductor layer sequence contains SnO.

50. In the same field of endeavor, Tarsa teach a current spreading layer contains SnO (ITO layer 11 in fig. 5, column 5, lines 15-33) for the benefit of improving current spreading characteristic (abstract).

51. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the current spreading layer on the side comprising the n-conductive layer of the semiconductor layer sequence containing SnO for the benefit of improving current spreading characteristic.

52. Regarding claim 28, Kneissl remain as applied in claim 1.

53. However, Kneissl do not teach that at least one of said current spreading layers comprises a recess.

54. Tarsa teach a current spreading layer (layer 46 in fig. 5) comprises a recess (recess filled by layer 47 in fig. 5).

55. Regarding claim 29, Kneissl remain as applied in claim 1.

56. However, Kneissl do not teach that disposed in said recess is an electrically conductive contact surface.

57. Tarsa teach an electrically conductive contact surface (layer 47 in fig. 5) disposed in a recess.

58. Regarding claim 30, Kneissl remain as applied in claim 1.

59. However, Kneissl do not teach that the electrical contacting of said radiation-emitting semiconductor component takes place via said contact surface.

60. Tarsa teach that the electrical contacting of said radiation-emitting semiconductor component takes place via said contact surface (column 7, lines 14-29).

61. Regarding claim 31, Kneissl remain as applied in claim 1.

62. Moreover, Kneissl teach that the radiation-emitting semiconductor component as in claim 30, wherein disposed on the side of said current spreading layer facing said semiconductor layer sequence and provided with said recess and said contact surface is a jacket layer (layer 117 in fig. 1).

63. Regarding claim 32, Kneissl remain as applied in claim 1.

64. Moreover, Kneissl teach that the radiation-emitting semiconductor component as in claim 31, wherein said jacket layer is poorly electrically conductive (column 6, lines

44-47) with respect to said contact surface, such that the current partially flows into said current spreading layer.

65. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claim 21 above, and further in view of Ishikawa et al (US Patent 5,977,565).

66. Regarding claim 22, Kneissl remain as applied in claim 21.

67. However, Kneissl do not teach that said carrier contains GaAs.

68. In the same field of endeavor, Ishikawa teach a carrier (layer 201 in fig. 4) containing GaAs for the benefit of providing high surge resistance (abstract).

69. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make said carrier containing GaAs for the benefit of providing high surge resistance.

70. Claims 23-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claims 21 and 11 above, and further in view of Azdasht (US Patent 6,072,148).

71. Regarding claim 23, Kneissl remain as applied in claim 21.

72. However, Kneissl do not teach that said radiation-emitting semiconductor component is affixed to said carrier by means of a solder metallization.

73. In the same field of endeavor, Azdasht teaches that affixing a semiconductor component to a layer by means of solder metallization for the benefit of affixing in few steps since solder bumps can be eliminated (column 13, lines 16-19).

74. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to affix said radiation-emitting semiconductor component to said carrier by means of a solder metallization for the benefit of affixing in few steps.

75. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

76. Regarding claim 24, Kneissl remain as applied in claim 11.

77. However, Kneissl do not teach that a solder metallization is disposed on said mirror layer to affix said radiation-emitting semiconductor component to a carrier.

78. In the same field of endeavor, Azdasht teaches that affixing a semiconductor component to a layer by means of solder metallization for the benefit of affixing in few steps since solder bumps can be eliminated (column 13, lines 16-19).

79. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a solder metallization disposed on said mirror layer to affix said radiation-emitting semiconductor component to a carrier for the benefit of affixing in few steps.

80. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

81. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claim 25 above, and further in view of Steigerwald et al (US Patent 6,573,537 B1).

82. Regarding claim 27, Kneissl remain as applied in claim 25.

83. However, Kneissl do not teach that said contact surface has on the side facing said semiconductor layer sequence a layer that reflects the generated radiation.

84. In the same field of endeavor, Steigerwald teach an electrode has a layer that reflects a generated radiation of a semiconductor device for the benefit of improving extraction efficiency (column 6, lines 51-52).

85. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make said contact surface having on the side facing said semiconductor layer sequence a layer that reflects the generated radiation for the benefit of improving extraction efficiency.

86. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claim 1 above, and further in view of Takamoto (PG Pub 2003/0136442 A1).

87. Regarding claim 34, Kneissl remain as applied in claim 1.

88. However, Kneissl do not teach that said first current spreading layer on the side nearest said semiconductor body adjoins a p-conductive AlGaAs-containing layer.

89. In the same field of endeavor, Takamoto teaches a tunnel junction layer made of p type AlGaAs for the benefit of making the layer using low temperature, so that the process of making the layer would not deteriorate the layers that have already been made (paragraph [0049]).

90. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make said first current spreading layer on the side nearest said semiconductor body adjoins a p-conductive AlGaAs-containing layer (the tunnel junction layer 120 in fig. 1 of Kneissl's invention) for the benefit of making the layer using low temperature.

91. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kneissl et al (US Patent 6,515,308) as applied to claim 17 above, in view of Tarsa et al (US Patent 6,614,056 B1), and further in view of Lin et al (PG Pub 2002/0131462 A1).

92. Regarding claim 44, Kneissl remain as applied in claim 17.

93. However, Kneissl do not teach that the current spreading layer on the side comprising the n-conductive layer of the semiconductor layer sequence contains SnO and Sb

94. In the same field of endeavor, Tarsa teach a current spreading layer containing SnO (ITO, column 5, lines 33) for the benefit of improving current spreading characteristic (abstract).

95. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the current spreading layer on the side comprising the n-conductive layer of the semiconductor layer sequence contains SnO for the benefit of improving current spreading characteristic.

96. Furthermore, in the same field of endeavor, Lin teach a current spreading layer containing Sb (antimony, paragraph [0053]) for the benefit of improving current conduction characteristic (paragraph [0053]).

97. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the current spreading layer on the side comprising the n-conductive layer of the semiconductor layer sequence containing Sb for the benefit of improving current conduction characteristic.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Feifei Yeung-Lopez whose telephone number is 571-270-1882. The examiner can normally be reached on 7:30am-5:00pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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